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(Quoted from the Constitution)

"To promote the study and dissemination of knowledge of the cause, prevention and control of diseases of the teeth, their supporting structures and adnexa and related subjects; and to foster and promote a better scientific understanding between the fields of dentistry and medicine."

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THE JOURNAL OF DENTAL MEDICINE

Editorial

THE JOURNAL TAKES ON A NEW LOOK

The Academy membership will be surprised and we hope pleased with this issue of the Journal of Dental Medicine. For many months the staff has been working on plans to expand the Journal, and what you see here is just the beginning of a project to make our publication one of the finest in the United States. Beside the physical changes which one immediately notices, plans have been formulated to expand the Journal so that a more complete coverage of the field of dental medicine may be achieved. We hope that our readers will approve of the change in size, the improved eye appeal of the cover, and the minor typographical changes that make for better and easier reading.

Since its inception in 1945, the American Academy of Dental Medicine has successfully fullfilled its objectives, that is: "To promote the study and dissemination of knowledge of the cause, prevention and control of diseases of the teeth, their supporting structures and adnexa and related subjects; and to foster and promote a better scientific understanding between the fields of dentistry and medicine." This enlarged Journal will help the Academy to carry on these objectives for many years to come.

In addition to several scientific articles that appear in our Journal, Book Reviews, Medical Views on Oral Problems, Academy News, and Announcements usually round out our issue. From time to time we hope to add additional features to our periodical. This issue is related to Endodontia, and we have tried to cover every facet of this topic so as to give our readers a complete review of the subject. We hope to devote future issues of the Journal to one particular field, with the hope that the membership will enjoy reading a complete presentation of a topic. In the near future we plan on establishing a question and answer column. Subscribers may send our editor questions relating to Dental Medicine and we will secure authorities in that field to answer them. From time to time we hope to have short articles on recent pharmacological advances in the field of Dental Medicine. New drugs, their dosages, indications and contraindications will be discussed. Section news will be increased, and with the cooperation of each Section Editor, our membership in Montreal will know what our members in Baltimore and Philadelphia are doing and thinking.

This newly enlarged Journal is a step forward for the American Academy of Dental Medicine. We invite your constructive criticism. This is your Journal. Your suggestions will be greatly appreciated, for it is you whom we serve, and you are the Academy.

"ENDODONTIA IN DIAGNOSIS AND TREATMENT PLANNING"

M. B. AUERBACH, D.D.S.,* *Brooklyn, N. Y.*

Endodontia is the branch of dentistry which concerns itself with pulp treatment and root canal filling so that the treated tooth will continue to function as a member of the masticatory apparatus. This treated tooth must remain in a healthy condition and cause no harm to the patient.

In approaching the problem of Endodontia in diagnosis and treatment planning, questions to be answered may be summarized as follows.

(1) Is it possible to treat a tooth and have it remain in the mouth as a healthy, functioning member of the masticatory apparatus?

(2) What teeth should be accepted for treatment?

FUNCTION OF TREATED TOOTH

The function of a tooth depends on the periodontal structures, not the pulp. In a fully formed tooth, the pulp functions to protect itself. When the pulp is removed, this protection is no longer needed. Secondary dentin can no longer be formed, but secondary dentin formation is largely to protect the pulp from an advancing carious lesion. In a treated tooth, there is no pulp requiring protection.

The pulpless, treated tooth is not a "dead" tooth. The question of metabolism in enamel and dentin is under investigation in both normal and pulpless teeth. However, it has been repeatedly demonstrated that the cementum retains its complete physiologic function after root canal treatment. Cementum is a tissue which has the least physiologic relationship to the pulp. Physiologically it is related to the periodontium.

In a treated tooth, the cementum continues to deposit new layers of tissue. It continues to function as a connection between the tooth and the periodontal tissues. It maintains the integrity of the epithelial attachments and the dynamic adjustments of the periodontal membrane to tooth movements in mastication. It acts as a reparative agent, sealing off the apex of the treated tooth.

With the cementum alive and performing its physiologic and reparative functions, the tooth is a live, functioning member of the masticatory apparatus. The properly treated pulpless tooth can perform all the functions of a normal tooth. In terms of function it is just as vital as an untreated tooth.

HEALTH OF TREATED TOOTH

Having decided that a treated tooth continues to perform its function, the question of its state of health in relation to its host must be considered. Does a treated tooth remain in the mouth as a healthy member? In our opinion the answer is, yes. This opinion is based on clinical and roentgenographic evidence gathered from thousands of treated teeth checked over long periods of time.

In Figs. 1A, 2A, 3A, we have radiographs of teeth with periapical areas. Let us retrace the sequence of events which resulted in this lesion to the periapical bone as manifested on the radiograph as a radiolucent area. Due to the presence of an irritant (a cavity, trauma, chemicals, heat, etc.) the pulp of this tooth responded with an inflammation. An inflammatory exudate developed, which began to feed out through the periapical foramen into the periapical tissues. This inflammatory exudate acts as an irritant to the bone, causing the liquefaction of the bone, as shown on the radiograph as a periapical area of translucency.

The periapical area is due to the irritating contents of the root canal. One way to deal with a tooth such as this is extraction. When a tooth such as this is extracted, and a new radiograph is taken a few months later, one finds that the area has cleared up, new bone

* Assistant Professor of Endodontia, New York University, College of Dentistry.

A

B

C

Fig. 1—Upper lateral incisor, non-vital, periapical area.

A. Before treatment.
B. Checkup after 6 months.
C. Checkup after 1 year.

has filled in, and the tissues *are considered healthy once more.*

The above sequence of events is an every-day occurrence. The extraction of the tooth removes the cause. With the cause removed, the periapical tissues repair. By removing the cause, we have placed the periapical bone in an environment in which it can heal itself.

The cause of the periapical pathology, however, is not the tooth—rather, it is the contents of the root canal. Extraction, in this case is a radical procedure, in that we had to remove the entire tooth in order to eliminate the contents of the root canal.

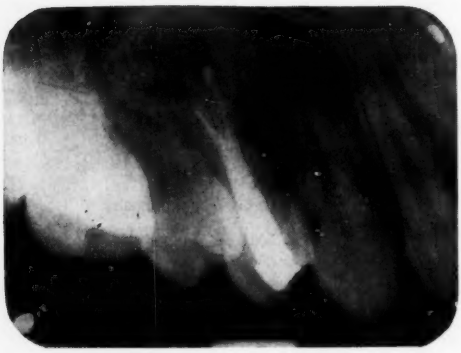
RATIONALE OF ENDODONTIA

If Endodontia is a rational procedure, we should be able to remove the contents of the root canal, remove the cause of the periapical area, and have the periapical area clear itself without the necessity of removing the tooth. Fig. 1 B,C. Fig. 2 B.C. Fig. 3B.

Endodontia is a surgical procedure which removes the cause of periapical pathology, allowing the periapical tissues to heal themselves. The dental profession accepts the radiograph as evidence of the presence of pathology. To be consistent and logical, then, absence of radiographic evidence of pathology, particularly following a surgical procedure such as

A

B



C

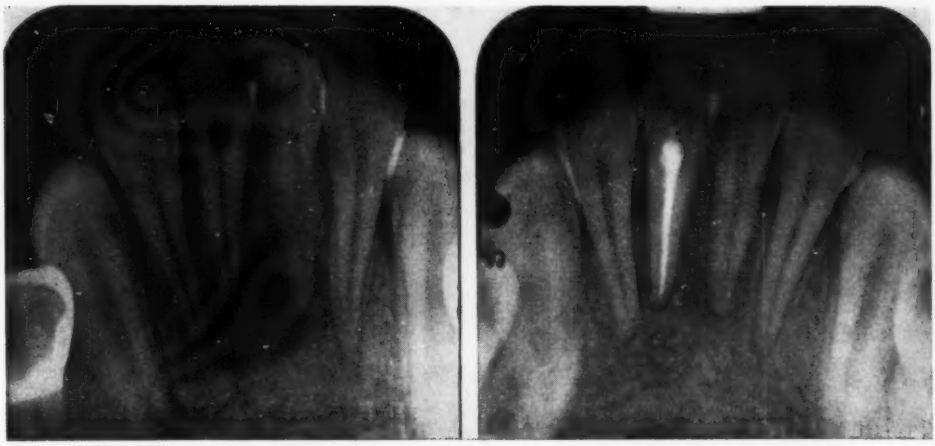
Fig. 2—Upper first bicuspid, non-vital, periapical area.

A. Before treatment.
B. Post-operative.
C. Checkup after fourteen months.

A. Before treatment.

B. Checkup after 4 years.

Fig. 3—Lower first molar, non-vital, periapical area.



A. Before treatment. B. One year checkup.

Fig. 4—Lower central incisor, non-vital, periapical area. The retention of this tooth solves a difficult problem of aesthetics.

A. Before treatment. B. Post-operative.

Fig. 5—Upper second molar. Retention of this tooth affords occlusion to lower second molar.

Endodontia should be accepted as evidence of health. Tissue, especially bone, will not tolerate the presence of pathogenic micro-organisms or toxic materials. When these irritants are present, inflammation results and the roentgenogram reveals it as a translucent area at the apex. A large percentage of teeth with properly treated pulp canals, remain functional, comfortable, and radiographically negative and should be accepted as proof of the scientific basis of modern Endodontia.

SELECTION OF TEETH

Having discussed the question of treating teeth and having them remain in the mouth as healthy, functional members of the masticatory apparatus, the next question to consider is: What teeth to treat? Modern dental practition-

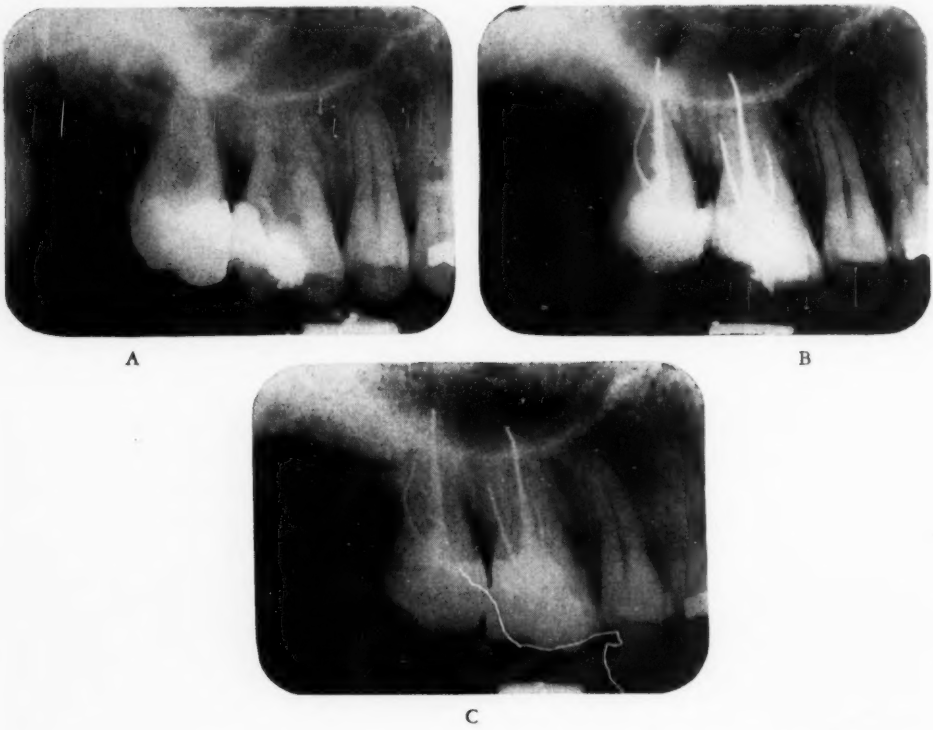


Fig. 6—Two molars. Endodontic treatment obviates necessity for partial denture or multiple-abutment cantilever bridge.

A. Before treatment.
B. Post-operative.
C. Checkup after 6 months.

ers are practicing full mouth rehabilitation. In doing so, I believe that they subscribe to the following principles:

That a patient's natural tooth is preferable to an artificial restoration. (Figs. 4, 5, 6)

That, wherever possible, a fixed restoration is preferable to a removable restoration. (Figs. 7, 8)

That, wherever possible, a partial removable restoration is preferable to a full denture.

Endodontia takes its place with Periodontia, Orthodontia and Surgery, as one of the branches of clinical dentistry which operates to prepare the mouth for rehabilitation. Endodontia assumes tremendous importance in instances where teeth requiring treatment, are of such strategic value, that they mean the difference between a fixed bridge and a partial denture, or between a partial denture and a full denture. (Figs. 9, 10)

STRATEGIC VALUE OF TEETH

The dentist, however, should never allow the strategic value of a tooth to be the sole criterion for the selection of that tooth for treatment.

Fig. 7—First molars with second molars missing. Loss of the first molar would necessitate a partial denture or a multiple-abutment cantilever bridge. Endodontia gives the patient first molar occlusion, eliminate bridgework.

A. Lower first molar:
Left—Before treatment.
Right—Checkup after 19 months.

Fig. 7—First molars with second molars missing. Loss of the first molar would necessitate a partial denture or a multiple-abutment cantilever bridge. Endodontia gives the patient first molar occlusion, eliminate bridgework.

B. Upper first molar:
Left—Before treatment.
Right—Checkup after 6 months.

Its aesthetic value may be high and it may be important as an abutment, but there are other important considerations which influence the prognosis.

As in all other branches of surgery, the endodontist depends on:

(1) The patient's resistance.

(2) The dentist's ability to carry out the treatment.

(3) The dentist's experience based on previously treated cases.

In all dental treatment, we depend on tissue resistance to tolerate the operative procedures, and to recover from the inflammatory processes

Fig. 8—Molars used as fixed bridge abutments after endodontic treatment. Thus avoiding partial dentures.

A. Lower second molar:
Left—Before treatment.
Right—Checkup after 3 years.

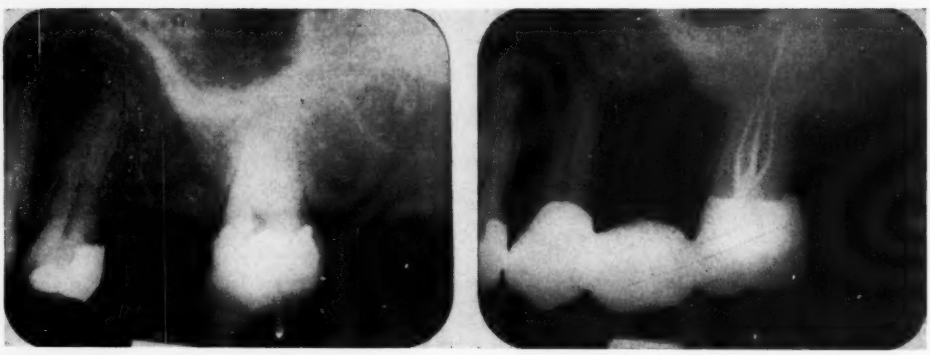


Fig. 8—Molars used as fixed bridge abutments after endodontic treatment. Thus avoiding partial dentures.

B. Upper second molar:
Left—Before treatment.
Right—Checkup after 1 year.

that follow them. When root canal treatment is carried out properly, its effect is comparable to and differs little from any other dental or surgical operation. If the patient could have a tooth extracted and have the socket heal normally, that patient can have Endodontic treatment.

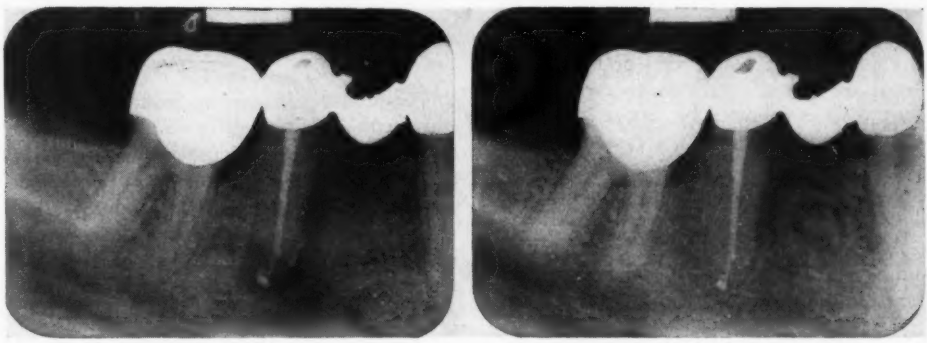
FACTORS FOR SELECTION

The factors for selection of a tooth for Endodontia then, are as follows:

(1) The patient has good resistance.
(2) The tooth has sound periodontal structures.

A. Before treatment. B. Four years after treatment.

Fig. 9—Upper first bicuspid serving as fixed bridge abutment following endodontic treatment. The result is preferable to use of cuspid both mechanical and aesthetically.



A. Post-operative. B. Checkup after 21 months.

Fig. 10—Lower second bicuspid, bridge abutment. Death of pulp and periapical area developed after bridgework. Endodontic treatment saves tooth and bridge.

(3) The tooth has strategic value.
(4) The anatomy of the canals are such that they are accessible to instrumentation and can be cleaned to the apices.
(5) The patient understands and accepts the treatment.
(6) The dentist has the experience and ability to handle the case.

Successful Endodontia is based on fulfilling the conditions and meeting the situations which arise during the course of treatment. The outcome is affected by a number of factors which do not appear in the final radiograph of the filled tooth. If these factors are carried out, the radiograph of a root canal filling, well condensed to the apex, will be evidence of successful treatment and a favorable prognosis will be assured.

Endodontia maintains the function and health of the tooth. For the best interests of the patient it should be included, where necessary, in the diagnosis and treatment planning.

One Hanson Place

BASIC REQUIREMENTS IN ENDODONTIA*

S. A. MACSWEEN, D.D.S., *Montreal, Que.*

That branch of dentistry now known as endodontia was for many years the "unwanted child" of the profession. In recent years it has reached its maturity and is now an active, robust and highly respected member of the dental family.

It has been proven that the pulpless tooth, whose canals have been treated and filled by current scientific procedures, can remain and function as a useful member of the dental arch. There is abundant histological evidence of periapical bone restoration without signs of infection.

The usual procedure in root canal therapy is to eradicate pulp tissue, vital or non-vital, infected or non-infected, under aseptic conditions. This is followed by proper instrumentation and sterilization of the canal with radiographic control for measured filling of the canal. The canal is filled and the tooth is taken slightly out of occlusion.

After pulp involvement has been diagnosed, and before proceeding with endodontic therapy, the following factors should be considered:

First, consider the age, health and general resistance of the patient. Extremes of age and chronic diseases are contraindications for successful endodontia.

Second, consider the strategic and esthetic value of the tooth involved. Evaluate the importance of the tooth as a necessary abutment for restorative work. Consider the number, shape and size of the roots and the accessibility to the canals.

The patient at this time must be informed of the meticulous technique necessary, the value of the services to be rendered and the importance of co-operation in keeping the series of appointments to be made. If this co-operation cannot be obtained then treatment is impossible. The patient should be told beforehand what he can expect during the treatment and also what is expected of him. A broken or postponed appointment can turn a tooth into an incubator and delay the progress of the case.

In order to carry through endodontic procedures effectively certain controls should be maintained:

1. Controlled sterilization of instruments and materials used.
2. Control of asepsis in the field of operation.
3. Control of the extent of the root canal filling.

For the sterilization of instruments, with sharp cutting edges, a *dry heat oven* at a temperature of 350 F provides positive sterilization, prevents rusting and dulling of instruments. The steam autoclave at 350 F and 15 pounds pressure for 20 minutes is an excellent means of sterilizing swabs and paper points. During the operation, cold sterilization is the method of choice.

Asepsis in endodontia depends upon the use of rubber dam, sterile instruments and antibiotics. Sterility of the canal is determined by culturing the dressings. Two negative cultures are required before final filling. In the life cycle of bacteria an enzyme is produced which can neutralize certain antibiotics. The culture medium should contain a bacterial enzyme capable of neutralizing any free antibiotic present on the paper point to be cultured.

Accurate radiographs are necessary for measurement control. A root canal file with rubber dam marker is inserted into the canal and a radiograph is taken with the marker set at the incisal or occlusal edge of the tooth. The image on the film shows the distance between the end of the file and the end of the root canal. The marker is adjusted to make up the difference and the canal is filled to the measurement.

* Presented as part of a three member panel of the Montreal Endodontia Society before the Annual Meeting of the American Academy of Dental Medicine, May 31, 1952, Montreal, Canada.

For nearly forty years, a standard technique for intraoral radiography has been practiced by the dental profession with a fair degree of success.

The bisecting-angle principle with a short anode-film distance has been the accepted technique, but recent investigation has developed a method which is capable of producing undistorted radiographic images. This refers to the parallelling extension-cone technique.

When the film is placed in such a manner as to form an angle with the objects, it becomes necessary to follow the bisecting-angle technique in which the rays are directed perpendicular to an imaginary line bisecting the plane of the object and the plane of the film. This angulation is necessary to avoid foreshortening or elongation. There remains, however, considerable distortion and it was to bring about greater accuracy that the parallelling cone-extension technique was developed.

When a radiograph is taken with the film positioned parallel to the object and with an increased anode-film distance, an undistorted image will be produced if the central rays are directed perpendicular to the film.

A fundamental principle of radiography states: The closer the relationship between the object and film (object-film distance) the greater the sharpness of the image; conversely, the greater the object-film distance the greater the blurring. Therefore, to parallel the film and object and not increase the anode-film distance will result in blurring and enlargement. Increase the a-f distance from the conventional 8 inches to 16 inches and the image will be sharp and more accurate.

The time distance law states that the time required for a given exposure is directly proportional to the square of the anode-film distance. If an exposure of 4 seconds at 10 milliamps (40 milliamp seconds) for an 8″ anode-film distance produces a film of a required density, then at a 16″ a-f distance it would be necessary to use an exposure 4 times as great as at 8″ a-f or 16 seconds (160 milliamp seconds). The increased a-f distance requires longer exposure time. Such a long exposure is impracticable and dangerous, but can be avoided by using a faster emulsion with the increased anode-film distance.

A fast film (4 times as fast) makes it possible to use the same exposure factors for 16″ as used for radiatized film at 8″. It must be realized that the faster emulsion films are more sensitive to handling, exposure and processing than are the slower emulsion type. A fast emulsion film, taken at the increased anode-film distance, and handled with reasonable care, will be superior to the slower type taken at the conventional 8″ distance.

By adhering to the basic requirements as mentioned above, successful endodontic results can readily be achieved.

ENDODONTIC PROCEDURES*

GEORGE ZIMMERMAN, D.D.S., *Montreal, Que.*

ROENTGENOGRAMS

Good endodontic therapy begins with the taking of roentgenograms that clearly show exact tooth length, as well as the root canal and pulp chamber.

RUBBER DAM

The use of the rubber dam throughout the various steps of treatment must be considered as a requisite. Not only does the rubber dam maintain a sterile field, but as has sometimes been recorded in the literature, also guards against the accidental loss of small instruments down the trachea.

BROKEN DOWN TEETH

If a tooth is so carious or broken down that it cannot receive the rubber dam properly, then that tooth should be prepared beforehand. When a posterior tooth has insufficient crown to maintain a clamp, a copper band, properly festooned at the gingival, and trimmed at the occlusal, so that it extends slightly on to the occlusoproximal surfaces, should be cemented over the remaining portions of the crown. The rubber dam is then clamped over this artificial crown. Should there be a large proximal cavity, extending underneath the gingival margin, precluding a dry field even with the rubber dam, it is best to clean out the decay first, place a piece of gutta percha over the pulp chamber, and restore the crown with an amalgam filling.

To control seepage of saliva around the gingival, the use of ligatures or the painting of the gingival area over the rubber dam with collodion or nail polish will often minimize this irksome problem.

OPENING INTO THE TOOTH

The opening into the tooth must be large enough to allow the horns of the pulp chamber to be reached, and to allow the insertion of files, etc., into the canals in a straight line. If a file has to bend to enter the canal, the opening is inadequate. In upper anterior teeth the opening into the pulp is made just below the cingulum at right angles to the lingual surface. From this point a flame shaped bur is used in the direction of the long axis of the tooth to create a straight line opening into the canal.

In upper molars the occlusal opening need not go distal to the transverse ridge. In lower molars, the opening is made wide buccolingually close to the mesial, but does not extend distally beyond the center of the middle cusp. In entering the pulp chamber of molars caution should be exercised not to penetrate the floor. In cases where the chamber is narrow, occlusogingivally, the bur should enter the chamber over the large palatal canal in the upper teeth and over the distal canal in the lowers.

Many of the mesial and buccal canals of molars are small and difficult to find, even with adequate exposure of the pulp chamber. A drop of iodine in the chamber, followed by alcohol, to remove the excess, will stain the openings of the canals, facilitating their location.

REMOVAL OF PULP TISSUE

As a general rule for the use of instruments in a canal, a small size should precede a larger size. A number one file is used before a number two file and a number two before a number three.

To remove vital tissue from an anterior tooth, a number one file followed by a number two file is inserted into the canal to create a path for the subsequent insertion of a barbed broach. This will make it easier for the broach to extend almost the entire length of the canal, and make it possible to remove the tissue in one piece. The use of coarse broaches is not necessary. The fine and medium variety should be sufficient. Should the nerve be particularly

* Presented as part of a three member panel of the Montreal Endodontia Society before the Annual Meeting of the American Academy of Dental Medicine, May 31, 1952, Montreal, Canada.

large, two broaches may be used in the canal at the same time.

Sometimes at the second visit the operator is disturbed to find some tissue still present in the canal. If these remnants are small, they may be removed with a file dipped in phenol or cocaine crystals. If they are large, it is best to reanesthetize before removal.

Following nerve extirpation, the length of the canal is determined by inserting the number one file carrying a marker until it meets a constriction of resistance point. At this point the file should be within one millimeter of the apex. Adjust the marker to the incisal edge. Radiograph and record the length of the file to the marker. At this visit the canal is cleaned with files marked to this recorded length.

In infected canals instrumentation at the first visit should not extend to more than half of the canal. The danger of pushing infected debris through the apex and exciting latent virulent organisms can cause the familiar blow-up, with the subsequent loss of operating time.

Do not force a file into the canal. If the file bends, reverse the turn and try it again. Better still, remove the file and use the next smaller file to enlarge the canal further. Most of the work with files is done with a pull stroke against the walls of the canal.

One of the most underemphasized steps in cleansing the canal is irrigation. Too much stress cannot be placed on the importance of removing all debris from the canals to establish an unfavorable environment for the growth of organisms. The irrigation is carried out with a glass syringe and a 25 gauge blunt needle. The preparations most commonly used are Kerr's Tri-chlor, chlorinated soda and the commercial preparation Zonite. The needle is inserted about half way into the canal and the solution is expelled slowly so as not to push any of the canal contents through the apex. Two or three washings at each visit are not considered excessive.

BROKEN INSTRUMENTS IN THE ROOT CANAL

A broken instrument in the canal presents a most difficult and disheartening problem to the operator. The most frequent causes for this type of accident are old and worn out instruments and their misuse in the canal. If the broken part of the instrument is at the apex, resection of that part of the root must be resorted to. If the fragment is closer to the coronal portion of the root, an attempt may be made to dislodge it with fine instruments, or to engage it with a new broach or file. Occasionally, if the canal is large enough, the broken piece may be bypassed with another instrument. If this is possible, the fragment is disregarded and the canal treated in the usual manner.

DRUGS

In the choice of drugs to treat a root canal, one must select a drug that has good bacteriacidal properties and at the same time is well tolerated by the periapical tissues. Formocresol, a popular drug of bygone years, will destroy bacteria readily enough, but at the same time will cause a highly inflammatory reaction of the tissues around the apex, and with continued use will lead to necrosis. Some of the drugs commonly used are oil of cloves, more often used for its sedative effect; beechwood creosote, a good drug with a somewhat lingering disagreeable odor; camphorated paramonochlorophenol, a good germicidal drug as well as nonirritating. In prolonged treatment it is good policy to rotate the medication of root canals to prevent the organisms from developing a resistance to the same drug. Whatever drug is used, one should bear in mind never to overmedicate the canal. Excess medication will readily destroy the organisms present, but it may at the same time damage the periapical tissues. Nature is our wonderful ally in combating infection and causing tissue to repair itself. If we lessen the power of the periapical tissues to do this job by irritating them with the use of excessive drugs, then we are retarding our own efforts.

The antibiotics have been used very successfully and have a definite place in root canal therapy. However, statistics have shown that the average number of treatments per case, successfully concluded, is only fractionally less

with the antibiotics than it is with drug therapy; *e.g.* 50 cases treated with antibiotics took an average of three visits, with drugs three and a half.

CULTURES

A positive culture, of course, indicates the presence of infection in the canal, if contamination is ruled out. Although it may be argued that a negative culture does not completely rule out the presence of organisms, nevertheless, it is the best means available at present to indicate when the canal is ready to be filled. To smell or look at a paper point that has been in the root canal 48 or 72 hours is hardly adequate to determine when the canal should be filled. Authorities have conducted experiments to prove this fact. A number of cases were treated until the operator thought that the canal was ready for filling. A culture was taken at this point and in 40-50 percent of these cases the culture was positive.

FILLING OF ROOT CANALS

If silver points are used they are usually confined to the lower anteriors and the posterior teeth. The gutta percha points are used in upper anteriors Occasionally. the large lingual root of the upper molars and the distal root of the lower molars are filled with gutta percha points if it is thought that these teeth, at some later date, might require a restoration carrying a post. In such cases, it is simpler to remove gutta percha from the canal to fit a post than it is to cut out part of a silver point.

Whatever method one chooses to fill the root canal, the objective should be to obtain a hermetic seal at the apex. In selecting the first gutta percha cone, care should be taken to see that it fits snugly at the apex. After it is fitted, the incisal part of the cone is cut flush with the incisal edge of the tooth, to serve as a guide to prevent the cone from being forced beyond the apex.

It is somewhat easier to fit a silver point. The numbers of the silver points correspond to the numbers of the size of the Kerr's files. The number of the largest file used in the canal determines the size of the silver point to be used. The silver point is fitted tightly at the apex, so that further pressure will not move it apically.

It is obvious that whether a silver or gutta percha point is used, it cannot entirely fill the apical opening. Therefore, a sealer is used in the apical portion of the point to complete the seal. If the sealer has a silver content, the excess should be removed from the pulp chamber with choroform or xylol, as the silver will discolor the crown.

After seating the silver point, it may be necessary to shorten the coronal portion to within the pulp chamber level. To do so, close the canal opening around the point, with a small piece of base plate gutta percha, fill the pulp chamber with the desired amount of cement. Allow it to set. The cement will hold the silver point rigid while the protruding portion is cut off with an inverted cone bur.

In cases of vital extirpation the root canal should be filled about one millimeter short of the apex so that the filling will not impinge on vital tissue; also to encourage the cementum to grow and eventually cover over the apical opening. Non-vital cases should be filled to the apex.

SUMMARY

1. Obtain an adequate opening into the tooth without sacrificing too much tooth structure.
2. Complete debridement of canals.
3. Do not force instruments into the canal.
4. Avoid traumatizing periapical tissues either mechanically or chemically.

SURGICAL INTERVENTION IN ENDODONTIA*

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A pulp-involved tooth with periapical pathology that cannot be restored to normal physiological function by conservative methods of treatment is a candidate for surgical intervention. Although there is still some discussion on the power of regeneration of periapical bone, most endodontists agree that the following cases are indicated for surgery.

1. Teeth with cystic involvement. We have seen cases where the cyst formation seemed to respect the apices of adjacent teeth. In a case of a cyst from mandibular cuspid to mandibular cuspid all teeth were found vital. The cyst was located at the labial and with careful surgery, the blood supply of a minimum number of teeth was interfered with.

2. Teeth with broken root canal instruments that extend beyond the root end which cannot otherwise be removed, except through the apical end.

3. Teeth in which pulp death was due to a fracture of the root in the apical third should have the apex removed surgically. If the pulp remains vital, the tooth should be left alone and repair will follow. If the pulp decomposes, surgery will be necessary.

4. Teeth whose roots have been perforated in the apical third due to a curved apex.

5. Teeth in which the root canal filling has been placed beyond the apex should have the root tips smoothed off.

6. Teeth with cup-shaped erosion of the apex.

7. Teeth where a negative culture cannot be obtained.

CONTRAINDICATIONS FOR SURGERY

There are several contraindications for surgery. When the pathology involves a vital landmark such as the sinus or the mandibular nerve, or where the accessibility is difficult, we avoid surgery. One should be cautious about surgery particularly in older patients, or in persons where general systemic diseases such as active diabetes, tuberculosis, syphilis, or anemia are prevalent, or where the general health of the patient does not warrant surgical intervention.

METHODS OF ROOT SURGERY

There are several methods of performing root surgery. Some methods are related to the case considered, others with the personal ability of the operator. These methods are:

1. Medication of the canal, overfilling, followed by surgery.

2. Immediate sterilization of the canal with caustics, followed by surgery at the same sitting.

3. The method of cutting the root apex first and then filling the canal, hence operating at both ends of the tooth.

4. The method of root resection with a crown in place, approaching the case from the apex.

5. The conservative method of periapical curettage.

PREMEDICATION

It is important to routinely premedicate the patient with barbiturates. It relieves tension on both the patient and the operator.

FILLING THE CANAL

The canal should be enlarged with files and reamers, then sterilized with strong acids and neutralized. The acid treatment was found to consume less time than the electro-medication treatment prior to surgery. The canal is irrigated with chlorinated soda, dried, and overfilled with gutta percha or silver points and silver cement. It is important to have good lateral condensation of the canal filling in order to have an hermetic seal at the apex.

* Presented as part of a three member panel of the Montreal Endodontia Society before the Annual Meeting of the American Academy of Dental Medicine, May 31, 1952, Montreal, Canada.

SURGERY

There are several factors that are important in the surgical procedure. It is of prime importance to have good local anesthesia so that one can have the complete cooperation of the patient. We use a 4% procaine solution with a good vasoconstrictor. If the patient's cardiac condition contraindicates the use of a vasoconstrictor, the operator will have more hemorrhage and more difficulty with the surgery. Local anesthesia is the best choice for the dentist, but general anesthesia can also be used. The mandibular block injection is used for the mandible while the infraorbital and nasopalatine injections supplemented with infiltration around the tooth in question are used for the maxilla. The incision should be made large enough for good accessibility. It is important to remove all the granulomatous tissue, and in the case of a cyst, all of the epithelial membrane must be removed. Care should be taken to remove all the debris from the area.

At this point we are confronted with a problem. Shall we amputate the apex or just curette around it? We believe that the tendency in dentistry is to save the natural tissues of the tooth as much as possible. We try to get around the apex, removing all the necrotic tissues by periapical curettage. If there is reason to think that the root end is deeply infected, or there is resorption, then the apex is removed. We believe that good, sound, sterile technic, and a normal non-infected blood clot is the best insurance for prompt healing after surgery. To facilitate healing, the flap should be sutured.

POSTOPERATIVE TREATMENT

It is good psychology to advise the patient that a swelling may take place or that a hematoma may form as a result of surgery. We have been experimenting with the enzymatic action of hyaluronidase in respect to postoperative swelling. Hyaluronidase promotes diffusion of interstitial pressure. Commercial hyaluronidase is dissolved in one cubic centimeter of normal saline solution and injected into the swelling. We have had some success in reducing the swelling of a hematoma with this solution, but few favorable results have been obtained in cases due to trauma of surgery.

PRACTICAL APPROACH TO CHEMOTHERAPY IN ENDODONTIA

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INTRODUCTION

In the practice of Root Canal Therapy, the efforts of the practitioner are directed at the complete removal of infected pulpal tissue, the sterilization of the root canal, and the placing of a root canal filling which will provide a hermetic seal against the ingress of bacteria and tissue fluids. In most cases these efforts have been amply rewarded by the maintenance in the dental arch of a functioning pulpless tooth. In some cases these efforts have failed, although the basic requirements of a good root canal procedure were adhered to. The inconsistency stems I believe, from a misunderstanding regarding the objective and scope of Root Canal Therapy. The objective extends beyond the root canal to apical and periapical tissues and all efforts should be directed to restoring and maintaining these tissues in optimum health. Any procedures which aid in restoring periapical integrity where pathology existed, are valuable adjuncts in the armamentarium of the Root Canal therapist.

An infected root canal may be visualized as a "zone of infection"[1] characterized by the products of suppuration—bacteria, pus, necrotic tissue and their products. A variable area in the vicinity of the apical foramen as the "zone of contamination,"[1] wherein the products of suppuration are provoking either stimulative processes of repair or cellular destruction. Usually both are manifest. The acute periapical abscess represents an extension of the zone of infection to apical and periapical tissues and the chronic abscess, the granuloma and the cyst, the manifold manifestations of cellular stimulation and destruction occurring simultaneously in the tissues in response to an irritant. It is not the purpose of this paper to discuss the resistance factors of the host which are of utmost importance in determining the outcome of the contaminated zone, but rather to evaluate the status of the zone of infection, and what may be done to nullify its effects.

When the zone of infection, is limited to the pulpal tissues of the root canal (vital and partially non-vital pulps), the removal of these tissues and the sterilization of the canal provides the most rapid means of maintaining the apical and periapical tissues in health. Surgical debridements by means of broaches, files and reamers, effect tissue removal and non-irritating chemo-therapeutics effect sterilization of the canal.

IS STERILIZATION NECESSARY?

In the past few years, a great deal of effort has been expended by many investigators in the field of root canal sterilization. The effectiveness of the drugs have been appraised in terms of their rapidity to sterilize the canal in the least possible number of treatments as determined by culture. On the other hand, many prominent practitioners[3] have raised the question, "What difference does it make if a few bacteria remain in the canal, or are present in the periapical lesion? So long as the canal has been chemically and mechanically debrided and has been filled with an inert material, the source of infection or reinfection has been removed."[3] Ross[2] writes, "Too often the excellence of the root canal filling has been stressed, while the attainment of sterility in the tooth has been minimized. Mere mechanical obstruction of the root canal procedure alone cannot prevent reinfection, which is prone to occur in the multicanaliculated and extensively arborized canal." The general practitioner reads, becomes confused and extracts the pulp involved tooth.

The confusion stems from having lost sight of the objectives of root canal therapy and a thorough appraisal of the existing pathology. No one can say with how many bacteria, if

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sterility be unnecessary, the vital resistance of the periapical tissues can deal. It is not that we do not have effective root canal therapeutics but that we have too many. Those who minimize the importance of root canal sterilization so glibly, do on the other hand recommend and use effective antibacterial agents in their procedures. Accurate in vitro methods to appraise our technics are as yet unavailable. The failure or success of the case ultimately depends on clinical and radiographic findings, some weeks to months later.

BACTERIOLOGIC CONSIDERATION.

The examination of several hundred smears and cultures has led us to the following conclusions:

(1) The dental bacteriologist does not as yet have a medium which will grow the microbial flora of the infected pulp in its existing qualitative and quantitative relationship.

(2) Tables of microorganisms, isolated from infected pulpal canals, depicting frequency in percent are misleading. They represent only those microorganisms which the investigator is capable of isolating with existing techniques.

(3) An evaluation of chemotherapeutics for use in endodontia based on bio-assay against one or more of these organisms is only a relative appraisal of one drug to the other and does not reflect *in vivo* action against the existing microbiota.

(4) The results of bacteriologic examination never of themselves authorize the filling of the canal. Their usefulness lies exclusively in telling us when the canal is not yet ready for filling.

(5) If the pulpless tooth is to receive routine treatment, then that treatment should be controlled bacteriologically.

CHEMOTHERAPEUTICS

Antibacterial substances whether derived from living organisms or from the laboratory must first be absorbed on and in microorganisms. They may then produce inhibition or death by bringing about reversible or irreversible protoplasm coagulation, by poisoning of some enzyme necessary for a vital metabolic process, or by affecting a profound alteration in the cell membrane permeability which prevents attainment of equilibrium with the environment.

The rationale for the use of many of our antibacterial agents in endodontia stems from consistently good results in a large number of cases. These agents can be grouped as follows:

a) *The Phenolic Compounds.*

These compounds are slowly soluble and penetrate deeply into inaccessible spaces. There effect is prolonged with concomitant anodyne properties. In this group are drugs which are widely used with consistently good results. phenol, formacresol, beechwood creosote, cresatin, camporated monochlorphenol, hexylresorcinol, metacresylacetate. These are general protoplasmic poisons and affect all species of microorganisms.

b) *The Volatile Oils.*

This group possesses moderate germicidal properties. They penetrate tissues readily and manifest a prolonged antibacterial and anodyne effect. In this group are such widely used drugs as eugenol, oil of cinnamon, oil of eucalyptus and oil of cloves.

c) *The Halogen Compounds.*

These substances are active germicides. Their activity is of short duration and greatly reduced by the presence of blood and organic debris. The chlorine compounds in particular are lymphagogus and canals will be found moist following prolonged exposure to chlorinated compounds. To this group belong such endodontic drugs as Trichlor (alkalinized solution of Chloramine T), chlorinated soda, iodine compounds, and electrosterilization or ionization technics.

d) *The Sulfonamide Group.*

This group of drugs in general is of little value since necrotic debris and pus neutralizes them. The flora isolated from root canals is only slightly to moderately sensitive to them and resistance occurs quite rapidly.

e) *The Antibiotic Group.*

This group has provided us with highly effective antibacterial agents without irritant properties. To properly evaluate and apply them, the practitioner must be familiar with their properties, incompatabilities and range of effectiveness.

1. *Penicillin* has limited application *per se* in Root Canal Therapy. Its antimicrobial spectrum does not encompass the enterococci and yeasts which are isolated from infected pulpal tissue with some frequency, many resistant gram positive strains are currently being encountered.

2. *Streptomycin*: This antibiotic has a wide antibacterial spectrum but its greatest disadvantage lies in the rapid building up of bacterial resistance. Many strains of enterococci and yeasts are not affected.

3. *Aureomycin, Chloromycetin and Terramycin* have a wide antibacterial range and resistance is developed slowly, if at all. These agents are ineffective against yeasts and in low concentration are incompatible with penicillin. They may effectively be used in conjunction with the phenolic compounds, or the volatile oil group, or they may be suspended in the propyleneglycol, 30% urea, or any of the cationic detergents, and carried to the teeth by means of a cotton point. If a fungicide is required to widen their range one of the parasepts—propyl, butyl or benzyl parahydroxybenzoate may be added in 0.1% concentration, or one of the caprylates.

4. *Bacitracin* displays an antibacterial spectrum similar to that of penicillin and in conjunction with the latter displays synergistic effects. In conjunction with the latter antibiotic, its gram positive antibacterial spectrum is increased, but its use in routine pulp canal procedures is limited.

Several salient points are important as regards antibiotics in general. They are inactivated by heavy metals, acids, alkalies and oxidizing agents. Aqueous solutions are unstable and should be made up fresh for topical application.

The placing of an antibiotic dressing following the flushing of a canal with an oxidizing agent is contraindicated. In fig. 2, may be seen the marked loss in activity of an aureomycin dressing following contact with a tooth flushed with chlorazene.

Fig. 1—Residual bacteriostatic activity of Aureomycin points following treatment.

Fig. 2—Partial inactivation of Aureomycin dressings following chlorazene contact.

In 1951, Grossman[12] introduced the term "polyantibiotic treatment of pulpless teeth" and recommended the combination of three antibiotics (Penicillin, Bacitracin, Streptomycin) and sodium caprylate in a nonaqueous vehicle, methyl silicone. This mixture, according to that author, provides ease of manipulation and rapid root canal sterilization. Stewart has recommended the use of a P.C.P. ointment consisting of two antibiotics (Penicillin and Chloromycetin) and an antihistaminic in a water soluble base. The same advantages are claimed for this mixture. The difficulty in introducing these materials into fine canals limits its application to select teeth. Widening of canals sufficiently to permit use of these agents may defeat our objective and induce periodontal pathology.

When the zone of infection has extended to apical and periapical tissues, the role of the chemo-therapeutics as adjuncts to the root canal procedure becomes increasingly important. It is in this phase of endodontia where the non-specific protoplasmic poisons of the phenolic, volatile oil and halogen group of compounds must be screened for effectiveness. In general, the irritant properties manifested by many of these compounds on periapical tissue will interfere with our objective of restoring apical and periapical tissues to normalcy as rapidly as possible. On the other hand, many of them are extremely useful agents and should not be discarded in the current scramble for a "blitz" bactericide. The creosote compounds for example have given consistently good results. Such compounds as formo-cresol, beechwood creosote and camphorated monochlorphenol applied sparingly have the ability to permeate dentinal tubuli and apical areas with effective germicidal activity and little if any irritant effects.

CHEMICAL DEBRIDEMENT

A discussion of the newer adjuncts to the surgical debridement of the canal should be of interest to the reader. Sulfuric acid, hydrochloric and phenolsulfonic acid, chlorinated soda and sodium-potassium, have at one time or another been advocated for tissue removal. Chlorinated soda and phenolsulphonic acid are still widely used. It is my intention at this point to discuss the application of two debriding agents which are specific and physiologic in action and possess none of the caustic, non-specific effect of the aforementioned compounds.

1. *Urea* in strong solutions has a remarkable solvent effect upon denatured proteins —necrotic tissue, pus and debris. It is innocuous to vital tissues and during its use the processes of repair are not retarded.[13, 14] In root canal procedures the author has used a 30% aqueous solution of urea as a debriding agent, an irrigant flush and as a carrier for the antibiotics. It is carried to the tooth with a needle and syringe for irrigating and debriding purposes. For intervisit medication, a suitable antibiotic such as Terramycin or Aureomycin in an amount equivalent to 2.0 mgs. (size of a pinhead) is added to a drop of the urea solution and a cotton point is saturated. The point is inserted into the canal and sealed with a double seal of gutta percha or temporary stopping. The following clinical results have been noted: a) Urea is bland and non-irritating to periapical tissues. b) It reduces hemorrhage and removes clotted blood from pulp canal walls. c) It deodorizes putrescent suppurating canals. d) It provides a means of obtaining an effective concentration of an antibiotic for between visit chemotherapy.

2. *Streptokinase - Streptodornase* (Varidase) are enzymes elaborated by certain members of the beta hemolytic streptococci. Streptokinase brings about lysis of clotted blood and streptodornase catalyzes the breakdown of desoxyribonucleoprotein which constitutes from 30 to 70 per cent of the sediment in thick purulent exudates. These enzymes provide an effective means of liquefying fibrinous or purulent barriers in those cases which present with a putrescent suppurating canal and a discharging fistulous tract. The author has used Varidase (Lederle) in such cases with excellent results. To a vial containing streptokinase, 100,000 units and

streptodornase, 25,000 units are added approximately 5 ml. of sterile saline. The canal is flushed with 1 to 2 ml. of this solution and 0.5 ml. of the agent is instilled into the fistulous tract. The enzymatic solution is allowed to act for fifteen minutes and the canal and fistulous tract are again flushed as indicated. A cotton point is then saturated with the Varidase solution to which a pinhead of Aureomycin has been added and placed into the canal as a dressing. In these cases prophylactic doses of antibiotics by the systemic route, oral or intramuscular, are indicated. In fig. 3, may be noted the radiographs of a case which presented with a fistulous tract of 18 years duration and was treated in the above manner; an apicoectomy was not performed. In twenty-four hours following enzymatic debridement, the opening of the fistulous tract was closed. Conservative root canal procedure was then instituted and a root canal filling placed.

Fig. 3—(left to right) Preoperative radiograph taken Nov. 7, 1951, case completed on Nov. 15, 1952, and postoperative check-up radiograph taken on Oct. 6, 1952.

These enzymes require further clinical investigation and application in endodontia before their value to the root canal procedure can be appraised.

The chemotherapeutics in themselves are only adjuncts in a good root canal procedure and success or failure cannot be attributed to them alone.

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OCCLUSAL IMPACT

(Its Relation to Preliminary Grinding)

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The use of visual aids in teaching has steadily gained in favor among educators. Their value lies in the fact that they help, by visual means, to explain difficult problems. By the use of simple diagrams the author proposes to explain the rationale behind certain complex procedures used in equilibrating occlusion.

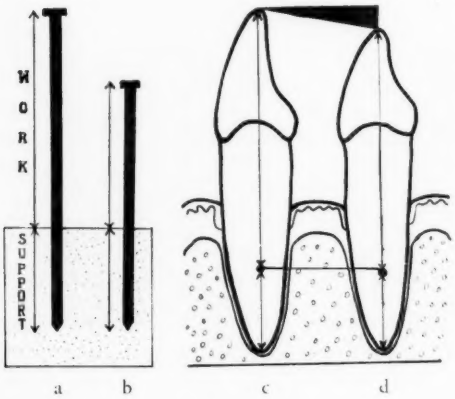

Figure 1

a, b, two nails set into a block of wood. c, lower incisor before the reduction of the incisal edge. d, same tooth after correction of incisal edge.

In figure 1, *a* and *b* represent two nails hammered into a block of wood, hence the supporting arms are equal. But nail *a* is longer than *b*. If we grasp *a* between two fingers and shake, we would probably be able to shake it out of the wood. It would be much more difficult to do so with *b*. This is because, in nail *a*, the work arm is very long in relation to the supporting arm, and therefore oblique forces applied to the head of nail *a* have great effect. In nail *b* the working and supporting arms are more nearly equal in proportion to each other, and if an oblique force equal in magnitude to the force used in nail *a* is applied, it will have less effect.

Figure 1 *c* represents an incisor tooth. Part of its bone support has been lost due to periodontal disease. Hence, its supporting arm is smaller, and, in relation to it, the working arm is larger. Masticatory forces applied to the incisal edge of the tooth have damaging effects. If we can reduce the size of this working arm we can reduce the detrimental effects of the masticatory forces. Figure 1 *d* represents shortening the tooth by the amount indicated and, of course, reshaping the incisal edge. We have reduced the discrepancy between the size of the two arms—they are now more nearly equal despite the fact that the fulcrum becomes slightly lower when the incisal edge is shortened. Hence, as in the case of nail *b*, the same applied forces will have less effect, and masticatory forces will be less damaging.

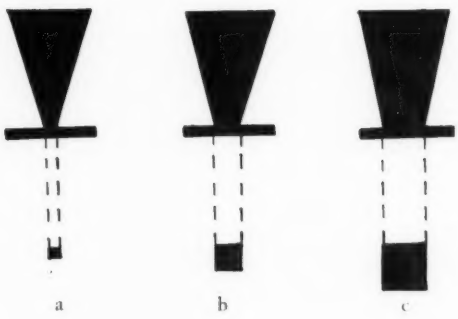

Figure 2

Schematically represents three knives in cross section. a, sharp knife; c, dull knife; b, knife intermediate between the two in sharpness.

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Let us examine the relative efficiencies of point or line-to-plane contact and plane-to-plane contact.

Figure 2 represents three knife blades in cross section in contact with a plane. 2 *a* represents a relatively sharp knife, *c* is a dull knife, and *b* is one with an intermediate degree of sharpness. Knife *a* is equivalent to a line-to-plane contact, knife *c* to a plane-to-plane contact. The relative amount of force brought to bear on each knife to produce equal efficiency is shown, approximately, by the squares below each knife blade. It is seen that the least amount of force is necessary with the sharp knife, and the greatest with the dull knife. Hence a line-to-plane contact is more efficient than a plane-to-plane contact, and much less force is necessary to produce efficient action.

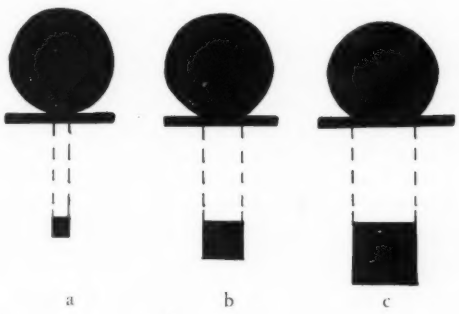

Figure 3

Represents three spheres doing work against a plane. a, small facet; b, somewhat larger facet; c, large facet.

Let us carry this thought one step further. Figure 3 represents three spheres doing work in contact with a plane. 3 *a* is a point-to-point contact, *c* has a large facet on it and is therefore a plane-to-plane contact, and *b* is again intermediate between the two. As in the case of the knives, sphere *a,* representing point-to-plane contact, is most efficient; while the most force must be applied to sphere *c* representing plane-to-plane contact. The ideal situation, therefore, is to have point-to-plane or line-to-plane contact.

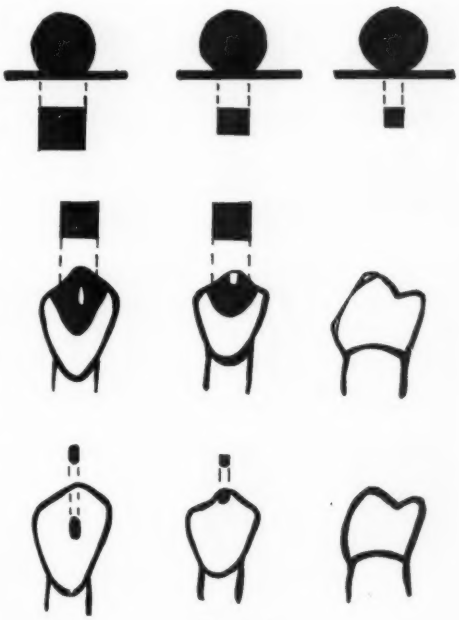

Figure 4

Shows the efficiency of plane-to-plane contact due to wear facets, and the method of correction.

If the relationship between two teeth is one of plane-to-plane contact, too much force must be applied to the teeth to enable them to do their work and overloading and overfunction results.

Figure 4 represents two bicuspids with wear facets on the buccal aspects. The top row of figures is a repetition of the idea established in figure 3. The second row represents the two bicuspids. The white spots within the facets represent points of centric contact, in the middle of the facet in one case, on the occlusal portion in the other. The squares above represent the relative force or loading necessary to do work.

The third row of figures shows the wear facets reshaped so that only the point or line of centric contact occludes with the plane of the opposing tooth. Note the reduction of the size of the squares indicating a lessening of the load carried by the tooth.

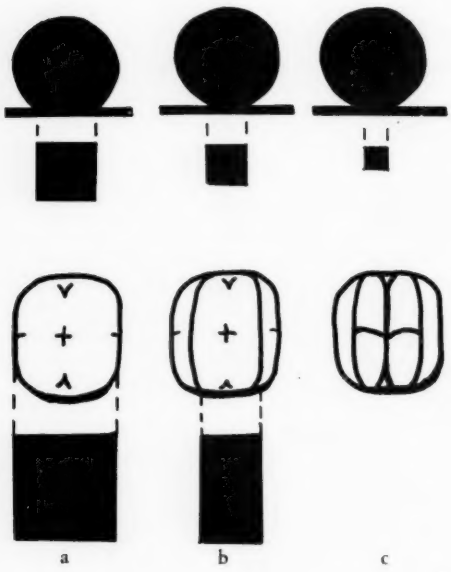

Figure 5

Shows the inefficiency of plane to plane contact due to worn occlusal surface, and its correction. a, original condition of tooth; b, reduction of bucco-lingual diameter; c, recarving of occlusal surface.

To the right is a proximal view of a bicuspid with a wear facet on the buccal aspect, with an indication of the manner in which reshaping is to be accomplished. Below it is a diagram of the facet correctly reshaped.

Abnormally worn teeth present a problem of masticatory inefficiency. In figure 5 *a*, the occlusal surface of a badly worn molar tooth is shown with its occlusal anatomy virtually obliterated and the occlusal bearing area abnormally large. The first step in its correction is the reduction of the bucco-lingual diameter as shown in *b*. By reducing the bearing area and therefore the size of the plane, an increase in efficiency and a reduction in loading is effected. This is indicated in the reduced size of the black rectangle in *b* as compared with the rectangle in *a*. But there is still a plane-to-plane contact, albeit a smaller plane. The next step, therefore, is to recarve the occlusal anatomy, producing sluiceways and cusps. Now, instead of a plane-to-plane contact, there is a line-to-plane contact produced for each cusp. See figure 5*c*. The overfunction of the tooth has been greatly reduced or eliminated.

The author realizes that the treatment of periodontal disease is not as simple as the foregoing might indicate. The causes of periodontal disease are varied and complex, and so are the treatments. However, he feels that these diagrams are valuable in helping to explain certain bio-mechanical phenomena connected with the treatment of periodontal disease.

709 West 176 Street

CANCER OF THE ORAL CAVITY*

ORIGÈNE DUFRESNE, M.D., *Montreal, Que.*†

Cancer of the mouth is a fairly frequent lesion, for almost 10% of all cancers appear in the oral cavity. Cancers of the lower lip and of the buccal and alveolar surfaces of the mouth are more common in men than women, the ratio being ten males to one female. Half of the oral carcinomas in females are localized in the tongue and because of this incidence it is found that the ratio of tongue involvement is six males to one female, a lower ratio than that for all oral carcinomas.

The dentist plays an important part in the discovery and diagnosis of cancer of the mouth. Our statistics show that in more than one-third of the cases, the dentist had been consulted by patients who thought they were suffering from some dental disorder rather than a malignant tumor of the mouth. If, therefore, the dentist is well informed of the symptoms of cancer of the mouth he can render a greater service to his patients and to the public at large. It is becoming more and more frequent for patients to visit the dentist at least once a year from childhood on through their adult years. It is more likely that many patients who otherwise enjoy perfect health might consult the dentist first regarding a condition in the mouth. It would seem, therefore, that in the dental faculties of our universities, lectures should be given on oral cancer by clinicians who are thoroughly familiar with all aspects of this disease. If dentists are trained to discover malignant tumors of the oral cavity they will be instrumental in saving many human lives. With cancer of the oral cavity, as in all cancers, early discovery is one of the most significant factors in prognosis.

Before attempting to tell how to make an early presumptive diagnosis or a positive diagnosis of cancer of the mouth, it would be well to recall a few facts of the etiology, histology, development, and clinical types.

ETIOLOGY OF CANCER OF THE MOUTH

When a normal cell has lost its function of normal reproduction and becomes a rapidly multiplying cell invading other tissues, we call it a cancerous cell. We do not know the causative factors in this change of function, nor what other intrinsic or genetic factors may be the cause of oral cancer. We do know, however, some extrinsic factors that seem to prepare the ground for oral cancer, namely the use of tobacco, nutritional deficiencies (avitaminosis B), syphilis, dental lesions and ill-fitting dentures in the above order of frequency. These are regarded as being of great importance particularly as irritants to living tissues and are considered as contributing factors.

One must remember, however, that these agents are not carcinogenic for in the history of any individual patient with oral cancer their significance is often not clearly evaluated. In many cases some form of chronic irritation can be found so that it is erroneous to ascribe one or other of the irritative factors as the cause of the lesion. Furthermore, it is well known that cancer of the mouth develops in patients where none of the above irritating factors are present. It is, therefore, difficult to be certain that the incidence would be decreased by the elimination of these extrinsic factors, for example, smoking, dietary deficiencies and syphilis. What can be done then, to combat cancer of the mouth? *Diagnose it early!*

HISTOLOGY

Most cancers of the mouth are epitheliomas and may involve the mucosa from lips to pharynx in one form or other. Broadly speaking there are two types of epitheliomas; those in which the basal cells reproduce and differ-

* Presented before the Annual Meeting, American Academy of Dental Medicine, May 31, 1952, Montreal, Quebec.

† Medical and Scientific Director, Radium Institute of the University of Montreal.

entiate, resembling the squamous layers of the epithelium (squamous cell carcinoma) and those in which the basal cells do not differentiate (basal cell carcinoma). In the squamous cell carcinomas the cancerous cell masses advance into and through the interstices of the normal tissues, penetrating the walls of lymphatic vessels, allowing cancer cells to lodge inside these vessels and thus establishing a new colony in another part of the body, i.e., spreading by metastases. In contrast, the basal cell carcinomas, as they develop, are preceded or are surrounded by a reaction of the stroma in which there are no lymph vessels and consequently no opportunity for metastases to develop unless, by chance, a long-standing basal cell carcinoma develops into a squamous cell epithelioma.

It is unfortunate for the patient that most oral cancers are of the squamous cell type which metastasize early. It can be understood then how important it is to make an early and prompt diagnosis, for the longer treatment is delayed the longer this type of cancer has to spread and the possibility of cure becomes lessened. The dentists' responsibility, therefore, does not end with the care of the teeth. They can contribute to the saving of many lives by being alert to the possibility of a neoplasm in the mouth and seeing to it that competent medical advice is obtained in order that treatment be instituted rapidly.

EVOLUTION OF ORAL CANCER

Like other cancers, those of the mouth begin an an area where one, or a few cells lose their normal regulating function, multiply rapidly, resulting in a tumor without sufficient blood vessels to nourish it and hence becomes necrotic and ulcerative. By rapid multiplication of new cells it involves nerve endings and infiltrates the surrounding tissues (firmness and adherence), spreading to regional cervical lymph nodes (cervical metastases) and finally causing death by such complications as sepsis, malnutrition, dehydration, pain, hemorrhage, respiratory obstruction and metastases to vital organs.

PATHOLOGICAL GRADING OF CARCINOMAS

Broders has graded these carcinomas as follows:

Grade 1..... 25%
Grade 2..... 50%
Grade 3..... 75%
Grade 4.....100%
} of undifferentiated cells.

CLINICAL STAGING OF ORAL CANCERS

It is important to know the clinical stage of the oral cancer since curability depends largely on the clinical stage:

Stage 1: When a cancer is small, well-limited, and without palpable regional lymph nodes the prognosis is good.

Stage 2: When it is poorly limited or with palpable but movable regional lymph nodes its prognosis is poor.

Stage 3: As in stage 2, but regional lymph nodes have become fixed and here the prognosis is almost hopeless.

Stage 4. When the cancer has spread to a number of distant lymph nodes or to other organs it is usually hopeless.

It is extremely important to obtain a positive diagnosis without delay whenever one suspects a cancer of the mouth. A delay of a few weeks, or even a few days, may result in the spread of a localized lesion to regional lymph nodes and in this short time what was once a highly curable now becomes one in which the possibility of cure is poor or it may reach the incurable stage. One should never give expectant or temporary treatment for an oral lesion until the possibility of oral cancer has been eliminated. Whenever confronted with findings that suggest a malignant growth every effort must be made to establish an early diagnosis and a conservative attitude or temporizing treatment is strongly condemned.

CLINICAL TYPES OF ORAL CANCER

In an attempt to describe and classify the oral neoplasms that one meets the following is offered:

a) *Leukoplakic type (superficial cancer),* characterized by a white mucous patch which is heaped up on the surface, may be ulcerated or show cracking of the epithelium. There is a good deal of pain and the patient is unable to extend the tongue.

b) *Ulcerating type (boring cancer),* characterized by irregular ulcer with a firm, almost hard base and margins. It may not be painful, or only slightly painful, but has a tendency to bleed.

c) *Budding type (vegetating cancer),* characterized by a cauliflower like growth which is very friable and superimposed on a firm indurated base.

d) *Interstitial type (infiltrating cancer),* characterized by a mass which involves the tongue rather deeply and interferes with movements of the tongue.

It must be remembered that these four types are not equally curable and cannot be treated by the same method.

DIAGNOSIS OF MOUTH CANCER

Cancer of the mouth should be more readily diagnosed than cancer in other locations, for the entire oral cavity is accessible to 1) clinical inspection, 2) to digital palpation, and 3) one can easily obtain a small section for biopsy without specialized equipment.

SYMPTOMS OF ORAL CANCER

What are the findings and symptoms that should draw attention to the possibility of a malignant growth in the mouth?

a) When the mucous membrane surrounding a painful ulceration exhibits signs of a longstanding irritation in one of the following forms namely, atrophy, leukoplakia or chronic glossitis, such as ulceration is a very suspicious lesion.

b) When a small plaque or ulcer becomes indurated, that is, quite firm, and not painful, consider it as an early cancer and see that a positive diagnosis is made preferably by biopsy.

c) When you can remove tumor tissue as easily as you might take a scoopful of cottage cheese without the patient complaining of pain it is your duty to see that further examination is made by a physician competently trained in oral cancer and that a specimen of this tissue be sent for histological examination.

d) When you feel a mass in the mouth and in the neck which is often described as "woody" you can consider that this is cancer of the mouth and refer the patient immediately to a tumor clinic or to a surgeon.

DIFFERENTIAL DIAGNOSIS OF ORAL CANCER

a) When the ulceration is very painful, not indurated and is of sudden onset, in all likelihood it is not a cancer.

b) When the tumor has a smooth surface, a pedunculated base and is compressible and pigmented (blue, red or brown) it is probably not a neoplasm. You must realize that because of the seriousness of oral cancer it is much more important to the patient than any other condition with which it might be confused. The dentist should have cancer in mind whenever there is ulceration or a tumor of the mouth.

TREATMENT OF MOUTH CANCER

As is known there are two effective methods of treatment, namely, surgery and radiation therapy. Both methods have advantages and disadvantages. In general, primary lesions are more frequently treated by radiation, x-ray or radium, while metastases to lymph nodes in the neck are more frequently treated by surgery. There is still a difference of opinion as to how certain cases of cancer of the mouth should be treated. In my opinion, a cancer of the anterior portion of the tongue should be treated with radium needles while that of the posterior portion of the tongue should be treated with external roentgen therapy.

a) Cancer of the lower lip should be treated with contact therapy or with radium moulds.

b) Cancer of the medial surface of the jaw

should be treated with intra-oral roentgen therapy or with radium needles.

c) Cancer of the floor of the mouth with radium needles, or intra-oral roentgen therapy used if the tumor is not an extensive one. If, however, the tumor is a large firm mass involving the floor of the mouth or the side of the mandible, ligation of the carotid vessel is necessary followed by electro-coagulation.

d) Cancer of the gingiva should be treated with intra-oral roentgen therapy if it is small, and with coagulation with diathermy if it is advanced.

e) Finally all cancerous nodes that can be removed by surgery should be removed and only nodes that are inoperable should be treated with radiation.

CONCLUSION

Dentists play a very important role in the detection of oral malignancies, and should suspect cancer every time one finds an indurated, non-painful and non-healing lesion of the mouth. When such a suspicion arises do not "wait and see what happens." Get as prompt and accurate a diagnosis as possible and it may be necessary to co-operate with a physician or surgeon not only in diagnosis but also in the treatment.

The dentist has an unusual opportunity for the early recognition of oral cancer and by training can make a very important contribution toward solving the problem of oral neoplasms and its regional metastases.

FLUORIDATION OF WATER SUPPLY

Nearly 8 million persons in the United States are receiving fluoridated water as a protection against dental decay and the measure has been approved for more than 16 million others, it was reported recently in The Journal of the American Dental Association.

The report was based on a survey made by the Association's Council on Dental Health which found that as of Sept. 30, a total of 423 communities had placed the measure in operation and 305 other communities had approved the measure for future operation.

The yearly cost of the program was found to average slightly more than nine cents a person with one-fourth of the communities operating the program at an annual per capita cost of five cents or less.

The majority of the communities, the survey showed, financed the program through water revenues, many without an increase in rates.

The measure was being carried out in communities of all sizes, ranging from Norwood Village, Wash., serving 150 persons, to Washington, D. C., serving 1 million persons.

Fluoridation of public water supplies was found to be in operation in every state except four, Missouri, Nevada, Utah and Arizona.

Academy Proceedings

SPEAKERS AT MIDWINTER MEETING

Coordinator
COLONEL JOSEPH L. BERNIER, DC, USA

THEODOR BLUM, M.D., D.D.S.

SAMUEL C. MILLER
D.D.S., F.A.D.M., F.A.C.D.

NATHAN SAVITSKY, M.D.

SYMPOSIUM ON PAIN

At the Midwinter Meeting of the American Academy of Dental Medicine, Dec. 7, 1952, the above speakers presented a most interesting and informative discussion on "Pain."

Col. Bernier acted as Coordinator and introduced the subject. Dr. Blum spoke on the "Diagnosis, Control and Treatment of Pain." Dr. Miller discussed "Practical Considerations of Temporomandibular Joint Problems." Dr. Savitsky concluded the afternoon's scientific session with a discussion entitled the "Neurologist Reports on Head Pains." Participation in this symposium by both physicians and dentists will foster a better understanding of our mutual problems.

COMMITTEE ON ARRANGEMENTS MIDWINTER MEETING

L. to R. (top row) DRS. L. BOTWINICK, N. WACHTEL, L. OLDER, D. BECKER, W. COPPERTHWAITE.

L. to R. (bottom row) DRS. G. WITKIN, S. TURKENKOPF (Co-Chairman), J. A. ENGLANDER (Chairman), H. GELHAAR (National President).

MEMBERS ELECTED TO THE AMERICAN ACADEMY OF DENTAL MEDICINE

December 7, 1952

ABE J. ABELOFF
Brooklyn, N. Y.

EDWARD H. BOHLMANN
Los Angeles, Cal.

MORRIS BRADIN
Audubon, N. J.

OWEN L. CROFT
Halifax, Nova Scotia

SAMUEL GERBER
New York, N. Y.

BERNARD GRUBER
New York, N. Y.

JOHN P. JARABAK
Philadelphia, Pa.

GEORGE M. KOUTSONAS
Salonika, Greece

EDWARD LUSTERMAN
Rockville Center, N. Y.

HOWARD W. MARCUS
New York, N. Y.

CHARLES H. MOSES
Toronto, Canada

AARON A. MOSS
Bernardsville, N. J.

GAUDENCIO R. OCAMPO
Manila, P. I.

BARNEY A. POLSKIN
Plainfield, N. J.

*MARCELINO PULGAR
Maracaibo Venezuela

JAMES C. READER
Brooklyn, N. Y.

HERBERT ROTHSCHILD
New York, N. Y.

ALFRED L. SCHERZER
Montreal, Canada

EMIL SHAPIRO
Newark, N. J.

D. G. URSINI
New York, N. Y.

MELVIN WALLSCHEIN
Bronx, N. Y.

JOSEPH L. WISHNER
Helmuth, N. Y.

* Associate Member.

MEETING OF THE AMERICAN ACADEMY OF DENTAL MEDICINE IN TROIS-RIVIERES, QUE.

(Montreal Section)

On September 13-14 1952, the Montreal section of the Academy held a scientific and social session at the gateway of the St. Maurice Valley.

For this occasion, Dr. Harold R. Gelhaar, of Upper Montclair, N. J., and President of the Academy, was the guest of honor.

On Saturday, at the noon hour, after a two-hour journey by car from Montreal, the members dined at the Chateau Bleu, on the shores of the St. Lawrence River, five miles from Trois-Rivières. After the luncheon, the fifteen members and their wives continued on to the St. Maurice Hotel in Trois-Rivières, where Dr. Gelhaar delivered an interesting and informative address following the business session.

At half-past five o'clock, the group was entertained at a cocktail party in the St. Maurice Hotel prior to the official dinner of the session, and at eight thirty were guests of Dr. and Mrs. Conrad Godin at their residence. Later the same evening the members were entertained at a dance at the Radisson Canoe Club following which pictures of the St. Maurice Valley were screened. All resided at the Chateau Bleu for the night.

The next morning, there was a special Mass at the National Shrine in Cap-de-la-Madeleine, while the St. James Anglican Church and St. Andrew's United Church were open for services.

Luncheon was then held at the Chateau de Blois and following this, Dr. Gelhaar gave his impressions and thoughts on the session.

Appearing on this photo: Upper row: Dr. René Millette, *Trois-Rivieres;* Dr. Louis Rosen, Montreal; Dr. D. P. Mowry, Montreal; Dr. M. Goldenberg, Montreal; Dr. H. R. Gelhaar, Upper Montclair, N. J.; Dr. G. LaFrancois, Montreal; Dr. Conrad Gordin, *Trois-Rivieres;* Dr. F. L. Burns, Montreal; Dr. Albert LaFerrière, Montreal; Dr. George Clark, Boston; Dr. Gérard Pyamondon, Montreal;

2nd row: Dr. Viger Plamondon, Quebec City; Dr. Réal Lamothe, *Trois-Rivieres;* Dr. Herman Denoncourt, *Trois-Rivieres;* Mrs. Louis Rosen, Montreal; Mrs. Marcel Archambault, Montreal; Mrs. H. R. Gelhaar, Upper Montclair, N. J.; Mlle France Boucher, *Trois-Rivieres;* Mrs. R. E. Lussier, Montreal; Mrs. G. LeFrancois, Montreal; Dr. Marcel Archambault. Montreal; Dr. R. E. Lussier, Verdun; Dr. Fernand Beaudoin, *Trois Rivieres;*

1st row: Mrs. F. Burns, Montreal; Mrs. Herman Denoncourt, *Trois-Rivieres;* Mrs. Réal Lamothe, Cap-de-la-Madeleine; Mrs. M. Goldenberg, Montreal; Mrs. D. P. Mowry, Montreal; Mrs. Gérard Plamondon, Montreal; Mrs. Conrad Godin, *Trois-Rivieres.*

Medical Views on Oral Problems

CRACKS AT CORNERS OF MOUTH*

To the Editor: I read the letter on "Cracks at Corners of Mouth" and your reply in *The Journal* of Dec. 8, 1951 (page 1508) and the letters in the issue of April 19, 1952 (page 1460). One important cause of this complaint that was not mentioned is allergy to the material of which the dentures are composed. This was fully described as a cause of intractable cracks at the corners of the mouth four years ago in an article that stated the diagnosis could be confirmed by means of skin patch tests, with minute scrapings of the denture material and a control material applied to the patient's skin for 24 to 48 hours. I have had two patients in which this was believed to be the cause of cracks at the mouth. An adequate and balanced diet with supplementary vitamins had no effect whatever on the condition, but it cleared with the use of new dentures of different material. Incidentally, the skin test in one of these patients was negative. If it is accepted that cracks at the mouth may be a manifestation of an allergic response to some substance in dentures, it must be conceded that such cracks can occur with well fitting dentures, without malocclusion, and in the absence of infections.

W. B. ROANTREE, M.D.,
Champion Reefs P. O., South India

* J.A.M.A., Sept. 20, 1952.

CHEILITIS GLANDULARIS*

To the Editor: A patient in the middle sixties has been diagnosed by a dermatologist as having cheilitis glandularis, and he was told that nothing could be done for him. I wonder if other experts agree with this opinion.

M.D., Wisconsin.

ANSWER.—Because the condition long has been considered to be a congential hyperplasia of the mucous glands of the lips, treatment usually has been with radiation, surgical peeling of the involved tissue, or electrosurgical destruction. The administration of potassium iodide has been recommended also, as has therapy with antibiotics after appropriate culture studies. All of these methods have effected improvement in some cases, but too often the results have been somewhat less than satisfactory. Woodburne and Philpott (*Arch. Dermat. & Syph.* 62:20 [Dec.] 1950) reviewed the subject and reported three cases in which control of the disease was effected by psychotherapy.

* J.A.M.A., Nov. 15, 1952.

TRIGEMINAL NEURALGIA*

Data are presented on 689 cases of trigeminal neuralgia that were observed during the 10-year period from 1938 to 1948, inclusive. Of this number, 553 had been subjected to trigeminal rhizotomy, 49 had been given alcohol injections, and the remaining 87 received no treatment. Follow-up was accomplished by questionnaire, with a 69% response from the patients who had had trigeminal rhizotomy, a 55% return from those who had had alcohol injections only, and 41% response from the patients who had been untreated. Of the 36 untreated patients who replied four had complete spontaneous remission of their pain, 20 had recurrence of severe pain, 3 were operated on elsewhere with relief of discomfort, and 9 had received alcohol injections elsewhere with complete relief of discomfort in five. The authors gained the impression that trigeminal rhizotomy is a much more satisfactory procedure than alcohol injection in the average case of trigeminal neuralgia, for there has been complete relief of pain in all but 5.4% of the patients operated on. Alcohol injection, on the other hand, relieved the pain of only 15.2% of the patients for longer than one year. The incidence of complaints of crawling paresthesias (56%), of burning paresthesias (30%), and a numbness (4%) among the rhizotomy patients is much higher than frequently cited, and probably approximates the percentages of these symptoms after alcohol injection. Most of the patients, however, are so pleased to have relief of their severe pain that they frequently do not voice complaints about these discomforts unless directly questioned about the symptoms. Postoperative facial palsy occurred in only 6.5% of cases, and it was never permanent. The operative mortality was 1.6%, which is reasonable in a group in which more than a third were over 65 years old.

* Abstract, J.A.M.A., Nov. 15, 1952, p. 1150.

REFUTATION OF GENERAL ADAPTATION SYNDROME*

According to Selye's concept, any prolonged stress owing to a specific agent produces nonspecific reactions, which, with respect to this agent, always evolve in three distinct stages: the alarm reaction, the stage of resistance, and the stage of exhaustion. This syndrome has been explained on the basis of an adrenal cortex mechanism. However, the number of experiments carried out by Selye do not suffice for the establishment of a general law. Contrary to Selye's assertion, the evolvement of the specific reaction does not follow a unique pattern, but shows mutiple types,

differing from that which Selye considers as constant and universal. This can be illustrated in connection with chronic intoxication with arsenic salts, regarded by Selye as the sample-type of the general adaptation syndrome. Animal experiments performed by other workers have demonstrated that a true increase of specific resistance to arsenic salts does not exist. The apparent increase in resistance produced by the repeated oral administration of the insoluble salts is due solely to an inflammatory change in the intestinal mucous membrane, which prevents the organism from absorbing a considerable amount of the damaging agent. The occurrence of such a change in the localized specific resistance in certain tissue zones demonstrates the origin from the tissues rather than the humoral origin of the many changes of the specific resistance to stress. In not a single case does the reaction to arsenical stress correspond to the scheme described by Selye as universal. Three other types of variations in the development of "specific resistance" were demonstrated in connection with morphine and barbituric acid derivatives, tetanus and diphtheria toxins, and peptone, which all were considered by Selye as characteristic agents causing stress. On the basis of many precise biological facts that have been confirmed by other scientists, the author concludes that Selye's general adaptation syndrome does not exist. Concerning the adrenal cortex mechanism, which, according to Selye, explains the increase or diminution of the specific resistance, the author recalls that a nonspecific mechanism cannot account for a "specific" phenomenon. His own observations showed that the variations in the specific resistance are the consequence of multiple mechanisms, among which the local tissue or cell factors play, in general, a primary part.

* Abstract, J.A.M.A., Nov. 22, 1952, p. 1260.

TREATMENT OF TUBERCULOUS LYMPHOMA OF NECK*

Of 125 female and 43 male patients with tuberculous lymphoma of the neck who were treated at the Saint Claire Hospital in Basel between 1945 and 1950, 114 submitted to follow-up examinations within 1 to 6 years. As a rule tonsillectomy had been performed on all these patients, and microscopic examination of the removed tonsils revealed tuberculosis of the tonsils in 59 of the 114 patients, while 55 had nonspecific chronic tonsillitis. Of 52 patients whose treatment of the lymphoma consisted of tonsillectomy alone, 22 were cured, 20 were improved to such an extent that they could be considered as cured, and only 10 had recurrences. The therapeutic effect of tonsillectomy alone on the lymphoma was approximately the same in the patients with specific and in the patients with nonspecific chronic tonsillitis. Of the remaining 62 patients who were subjected to tonsillectomy as well as to surgical intervention on the diseased lymph nodes, 44 were cured, 11 were improved, and 7 had recurrences. Of the total of 114 patients, 66 (58%) recovered, 31 (27%) were improved, and only 17 (15%) had recurrences. As a result of these experiences the authors state that tonsillectomy is definitely indicated as first procedure in the treatment of tuberculous lymphoma of the neck. Radical excision of the lymphoma with subsequent roentgen irradiation should be attempted in cases in which the lymphoma does not show any tendency to regress after the tonsillectomy. In cases with progressive formation of abscesses in the involved lymph nodes, incision, excochleation, and local treatment may be sufficient. Chemotherapy without surgical treatment did not prove effective in the presence of foci with poor blood supply, but occasionally streptomycin alone or combined with *p*-aminosalicylic acid before the surgical intervention and for a short time after may be valuable in preventing hematogenous dissemination. Complications such as miliary dissemination or activation of another quiescent tuberculous focus did not occur after the tonsillectomy or after intervention on the lymphoma.

* Abstract, J.A.M.A., Nov. 22, 1952, p. 1260.

ANTIBIOTICS IN EPIDEMIC PAROTITIS*

The therapeutic effects of *p*-aminobenzoic acid, aueromycin, chloramphenicol (chloromycetin®), and terramycin on epidemic parotitis were compared in 75 patients to whom the drugs were given daily in equally divided doses every six hours. Twenty-eight patients received orally 1 to 2 gm. of *p*-aminobenzoic acid, with total doses of from 3 gm. to 38 gm. Twenty patients received orally 1, 2, or 3 gm. of aureomycin with total doses of from 4 gm. to 18 gm. Twenty-two patients were given orally and sometimes rectally 1, 2, or 3 gm. of chloramphenical, with total does of from 4 gm. to 12 gm. Five patients received orally 1 or 1.5 gm. of terramycin. Total doses were 4 gm. to one patient, 5 gm. to another, and 4.5 gm. to the other three. In most patients therapy was begun in the first days of illness and was continued for from 3 to 10 days. None of the drugs was effective in restoring temperature to normal; *p*-aminobenzoic acid had little effect on the swelling of the parotid gland, while the other drugs had none. None influenced the swelling of the submaxillary glands nor the already existing complications to the testes. Chloramphenicol and terramycin were good prophylactics against involvement of the genital organs, whereas the other two drugs had little effect. Aureomycin and chloramphenicol had a beneficial action on secondary meningeal reactions. The only side effects were two instances of slight intolerance to aureomycin.

* Abstract, J.A.M.A., Nov. 22, 1952, p. 1260.

MECHANISM OF CARIOSTATIC ACTION OF FLUORIDE*

The effectiveness of small amounts of fluoride in decreasing the incidence and extension of dental caries is now well established, at least in young persons who have not obtained full growth. However, the mechanism by which the cariostatic action of fluoride is produced is not yet completely understood. There are two main viewpoints. One is that fluoride decreases the solubility of the enamel in an acid medium, and another is that fluoride inhibits the growth of the acid-forming organisms in the mouth and thus indirectly decreases acid erosion. The former view was originaly based on the observation in 1939 that powdered enamel or dentine from human teeth became much more resistant to dissolution in acid (pH 4) if it was first treated with sodium fluoride. A number of subsequent investigations have confirmed this claim. One study, for example, has demonstrated that the presence of fluoride in drinking water lessens by 60% acid erosion of teeth of experimental animals by grapefruit juice. Other work has yielded similar results with various acids and at varying pH.

The view that fluoride produces its cariostatic effect by inhibiting the growth of the acid-producing microflora of the oral cavity was supported by the results of a comparison of the acidophilus counts in the mouths of children in Kingston, N. Y., where the drinking water contains almost no fluoride, with those of children in nearby Newburgh, where fluoride had been added to a concentration of one part per million. The acidophilus counts were consistently lower in the mouths of the Newburgh children. These observations have not been consistently confirmed. A recent study, for example, has demonstrated that topical application of sodium fluoride to the teeth of college students at weekly intervals for four weeks resulted in no statistically significent decrease in the acid-producing oral flora as compared with non-fluoride treated controls. These investigators conclude that their results do not support the "enzyme-inhibitor" explanation of the cariostatic effect of fluoride.

The current available evidence thus strengthens the earlier concept that fluoride decreases dental caries by increasing the resistance of the enamel to acid erosion by the acid-producing oral flora. A recent fundamental study of this general problem suggests a possible mechanism involved. Using isotope exchange and ion competition techniques, the University of Rochester investigators found that fluoride can replace hydroxyl or bicarbonate ions on the surafce of bone, thus forming a highly insoluble, resistant "fluoroapatite." Presumably the same phenomenon occurs in the mouth. Fluoride from drinking water is adsorbed or exchanged for another ion on the enamel of the tooth, thus forming the more acid-resistant fluoroapatite. This may explain the cariostatic action of fluoride.

* Editorial, J.A.M.A., Nov. 15, 1952.

BRACKISH TASTE, BLACK TONGUE AND ANTIBOTICS*

To the Editor: Two weeks after taking terramycin, 2 gm. per day, for urinary tract infection a patient had a brackish taste in the mouth. Dosage was reduced to 1 gm. a day and continued for one month. At the end of treatment, he experienced loss of appetite and had a dark brown, almost black, discoloration of the tongue. Symptoms and black tongue have continued two weeks after discontinuing treatment and are increasing. During the first week of treatment, 1 gm. of streptomycin a day was administered. Gantrisin® (3,4-dimethyl-5- sul fanilamido-isoxazole), 1 gm. a day, was taken for the first month. Can you suggest the cause? Do you recommend treatment?

M.D., Brazil.

ANSWER.—Patients who take terramycin, aureomycin, or chloramphenicol often complain of curious tastes in their mouths and loss of appetite. A metallic taste in the mouth is frequently found in patients taking these antibiotics. Black tongue has been reported in patients using penicillin lozenges or troches or penicillin as an inhalant. The same may be true of patients who are taking terramycin, aureomycin, or chloramphenicol by mouth. The blackening of the tongue generally disappears after the antibiotic is discontinued. As the correspondent feels that the blackening of the tongue is increasing, it is suggested that bacteriological investigation be made to see if superinfection with Asperigillus niger has occurred. If so, the lesion should be treated locally with methylrosaniline chloride (gentian violet) or a comparable agent.

* J.A.M.A., June 7, 1952

Book Reviews

The Merck Index of Chemicals and Drugs. Rahway, New Jersey, Merck & Company, 1952. 1167 pp. $8.00.

This new edition describes individual substances, structural formulas and known drugs. It constitutes a veritable encyclopedia for those interested in chemicals and drugs. It is a remarkable reference manual containing tables of indicators, coal tar color for foods, drugs and cosmetics, antidotes for poisons, standard buffers for calibrating pH measurements, radioactive isotopes, toxicities and hosts of other sources of authentic knowledge culled from the world literature. This monumental work is a credit to the members of Merck's scientific staff.

I. NEWTON KUGELMASS

Dentistry of Children. By John C. Bauer, William Demeritt, L. B. Higley, Maury Massler and Isaac Schour, Philadelphia, Blakiston Company, 1952. 454 pp. $10.00.

This well known and authoritative book of Pedodontics has been enhanced by the addition of a new and complete chapter on Removable Denture Prosthesis by Dr. W. W. Demeritt.

The third edition has been completely revised to include all the latest advances in practice management, child management, preventive dentistry and all operative procedures for the child.

New material has been added on future dental needs; parent management; preventive orthodontics; including a new section on local etiologic factors; periodontal disease in child and adult; premedication for cavity preparation; and chrome steel crowns. Space maintenance is fully discussed. The chapter on dental caries, completely rewritten, considers the pattern of caries attack, and methods of caries prevention and control. Schour and Massler have continued to improve their chapters on diet and nutrition which are like beacons of light in a sea of nutritional darkness.

Both the general practitioner and the specialist have been taken into consideration. No matter which phase of pedodontics or daily practice of dentistry one is interested in, he will be enriched by the wealth of information contained in this book.

HARRY ROTH

Health Resources in the United States. By George W. Bachman and Associates, Brookings Institute, 1952. 344 pp. $5.00.

There are at least three broadly related fields of inquiry pertinent to a study of health resources. First and foremost is an inquiry into the effect of research in the natural sciences upon the quality and quantity of health services. Second is an inventory of the existing resources. Third is an inquiry into the controlling social and economic factors in the supply and distribution of services. Scores of investigations bearing on one or more aspects of the health field are under way at the present time. It is generaly recognized that no one line of inquiry is by itself sufficient to lead to a complete understanding of the whole field. Most investigations require, as do most health programs, the integration of diverse pieces of information from the medical sciences and the social sciences.

The scope of this volume does not extend to all areas of inquiry mentioned. It is limited to a review of the state of the nation's health (Part I), and a factual inventory of health personnel (Part II) and facilities and services (Part III) in existence in the United States in 1950. The review of the nation's health furnishes a broad context of health conditions and problems for the inventory of resources. The inventory is a series of factual summaries, compiled for the most part from existing research materials and arranged in a fashion to bring out the major topics and problems in the field.

I. NEWTON KUGELMASS

Preventive Medicine and Hygiene. By Kenneth F. Maxcy, M.D., New York, New York, Appleton-Century Crofts, Inc., 1951. 1462 pp. $12.80.

This new edition presents a general orientation in the field of Public Health. The remarkable advances of this generation are well integrated. Many of the problems in the control of communicable disease have been solved or have become less infectious in this country. The fundamentals have provided a sanitary environment for our homes at the same time but the scope of this activity is necessarily broader with each era. There is now greater emphasis on the prevention of diseases of non-infectious origin, on the maintenance of health in old age, on the rehabilitation of the sick and the physically or mentally handicapped.

The book is divided into several sections. One deals with communicable diseases, the second with deficiency diseases, the third with prevention of disability and others include food sanitation, environmental medicine, industrial hygiene and sanitation methodology. Every aspect of public health National and International is embodied in this text, invaluable in everyday practice of all specialties.

I. NEWTON KUGELMASS

Announcements

POSTGRADUATE TRAINING IN PERIODONTIA AND ORAL MEDICINE NEW YORK UNIVERSITY COLLEGE OF DENTISTRY

The Periodontia Department of New York University College of Dentistry which has been giving postgraduate courses in this subject since 1926, announces its full time course in Periodontia and Oral Medicine for one academic year, September 21st 1953 to May 21st 1954, leading to a certificate. Half-time two year courses are also given. Three weeks refresher courses, as well as ten session, (one evening weekly), introductory courses are given beginning Feb. 25, 1953, June 1, 1953 and Oct. 8, 1953. All courses are under the direct supervision of Dr. Samuel Charles Miller.

For information concerning the above or courses in other phases of dentistry write to Secretary, Postgraduate Division, New York University College of Dentistry, 209 East 23rd Street, New York 10, N. Y.

CHILDREN'S DENTAL HEALTH WEEK, FEBRUARY 2-6, 1953

The Oral Hygiene Committee of Greater New York representing the First, Second, and Tenth District Dental Societies is again planning a program of community dental health education in the form of Children's Dental Health Week. This educational program will take place from February 2 through February 6, 1953. This specially designated week will represent the culmination of educational activities for both the dental profession and the child and adult lay public which has been going on throughout the year.

The program for 1953 will again stress four aspects of dental care. These will include the bitewing radiograph, toothbrushing and nutrition, fluoridation of the community water supply as well as the topical application of fluorides in the dental office. The Oral Hygiene Committee believes that this four point program will reach most of the parents and children of greater New York.

All members of the dental profession, dentists, dental hygienists, dental assistants, and dental dealers who are not as yet participating in this week-long project can get in touch with the headquarters of Children's Dental Health Week, room 202, 303 Washington Street, Brooklyn, 1, New York.

THE FOURTH ANNUAL BERKSHIRE CONFERENCE IN PERIODONTOLOGY AND ORAL PATHOLOGY

Tufts College Dental School Postgraduate Division will conduct an advanced conference in Periodontology and Oral Pathology under the direction of Dr. Irving Glickman and staff, at Eastover, a resort hotel in Lenox, Massachusetts, June 14 to 18,

1953. The conference will consist of four days of lectures, seminars, and panel discussions regarding clinical problems by outstanding teachers and clinicians in dentistry, medicine, and their related fields.

The curriculum is arranged so that mornings and evenings are devoted to professional activities, with afternoons open for recreation.

Eastover, a summer resort, is located high in the west ridge of the Housatonic River, eleven hundred feet above sea level, dominating an unbroken panorama of the Berkshire Mountains. It offers the ideal environment for both concentrated study and recreation.

The Curriculum for the Conference

Diseases of the Tongue, their Diagnosis and Treatment

Bone in Health and Disease

Clinical Implications of the General Adaptation Syndrome

The Diagnosis and Treatment of Gingival Disease

Stomatology in Children

The Effect of Drugs, Tobacco, Alcohol, and Common Food Substances on the Oral Tissues

Principles of Occlusion Pertinent to the Periodontal Problem

Temporo-mandibular Joint Disturbances, Their Etiology, Diagnosis, and Treatment

Clinical Approach to the Correction of Occlusal Disturbances in the Management of Periodontal Disease

For further information write:

BERKSHIRE CONFERENCE
Tufts College Dental School
136 Harrison Avenue
Boston 11, Massachusetts

POSTGRADUATE COURSE AT NORTHWESTERN

On April 1st, 2nd and 3rd a course in Occlusion, Analysis and Treatment of Stomatognathic System will be given at Northwestern University, Chicago, Ill. The faculty will consist of Drs. Sicher, Granger, Harris, (Prof. of Physiology in Northwestern) Lindblom Beyron and Thompson. The tuition fee is $100.00 and the course will be limited to 75 individuals.

Those interested will please write to Dr. Samuel Mintz, 435 East Front Street, Plainfield, N. J. for application forms.

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